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IS 4062 (1986): Foot-Operated Head-Light Dip Switches for Automobiles [TED 11: Automotive Electrical Equipment]



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Edition 2.1

(1995-08)

Indian Standard

**SPECIFICATION FOR
FOOT-OPERATED HEAD-LIGHT DIP
SWITCHES FOR AUTOMOBILES**

(First Revision)

(Incorporating Amendment No. 1)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Price Group 3

Indian Standard

SPECIFICATION FOR
FOOT-OPERATED HEAD-LIGHT DIP
SWITCHES FOR AUTOMOBILES
(*First Revision*)

Automotive Electrical Equipment Sectional Committee, ETDC 14

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Indian Standard
SPECIFICATION FOR
FOOT-OPERATED HEAD-LIGHT DIP
SWITCHES FOR AUTOMOBILES
(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 27 February 1986, after the draft finalized by the Automotive Electrical Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 In the automobile headlight, a meeting beam (dip beam) is provided in addition to the driving beam so as to reduce the dazzle for the observer approaching ahead of the vehicle. The headlight dip switch is intended to permit change over the circuit of the headlight to either driving beam or meeting beam by foot action.

0.3 This edition 2.1 incorporates Amendment No. 1 (August 1995). Side bar indicates modification of the text as the result of incorporation of the amendment.

1. SCOPE

1.1 This standard covers the basic mechanical and electrical requirements and methods of test for 12 and 24 volt foot-operated head-light dip switches for automobiles to changeover the circuit of head-light by foot action.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Dip Switch — A device to changeover the circuit of head-light by foot action, by bringing into operation either driving beam or meeting beam (dip beam).

2.2 Meeting Beam (Dipped Beam) — A beam of light specially designed to ensure safety when vehicles meet. In the present state of technique it is a beam illuminating only a specified limited part of the road in order to reduce dazzle for an observer approaching ahead of the vehicle.

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2.3 Driving Beam (Main Beam) — A beam of light intended to illuminate the road over a greater distance ahead of the vehicle.

2.4 Type Tests — Tests carried out to prove conformity with the specification. These are intended to prove the general qualities and design of a given type of dip switch.

2.5 Acceptance Tests — Test carried out on samples taken from a lot for the purpose of acceptance of the lot.

2.5.1 Lot — All switches of the same type, design and rating, manufactured by the same factory during the same period, using the same process and materials, offered for inspection at a time shall constitute a lot.

2.6 Routine Tests — Test carried out on each switch to check requirements which are likely to vary during production.

2.7 Ratings — The voltage and current range at which the switch is designed to operate satisfactorily.

2.8 Rated Voltage — The operating voltage specified by the manufacturer for each terminal or pair of terminal at which the switch is designed to operate satisfactorily.

2.9 Rated Current — The maximum current specified by the manufacturer for terminal or pair of terminals at which switch is designed to operate satisfactorily.

3. RATED VOLTAGE AND LOAD

3.1 Rated Voltage — The rated voltage of the dip switch shall be 12 or 24 volts.

3.2 Rated Load — The dip switch shall be capable of handling the rated current.

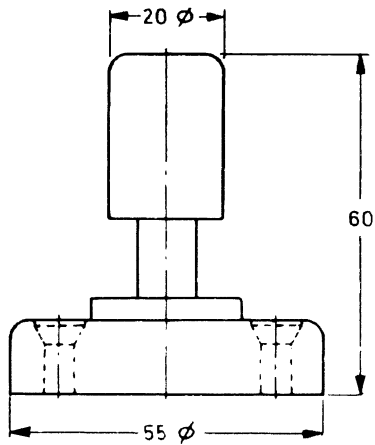
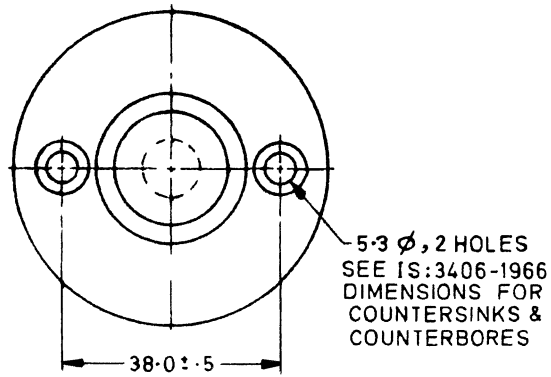
4. DIMENSIONS

4.1 The outline and fixing dimensions as well as the details of the terminals of the dip switches shall be as given in Fig. 1.

5. MARKING

5.1 The switch shall have the following information marked indelibly at a conspicuous place:

- a) Name and/or trade-mark of the manufacturer;
- b) Terminal numbers;
- c) Rated voltage and current;
- d) Month and year of manufacture; and
- e) Country of manufacture.



All dimensions in millimeters.

FIG. 1 DIMENSIONS OF SWITCHES

5.2 The switches may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

6. TESTS

6.1 Certification of Tests

6.1.1 *Type Tests* — The following shall constitute type tests:

- a) Visual examination (*see* **6.2**);
- b) Measurement of dimensions (*see* **6.3**);
- c) Performance tests (*see* **6.4**);
- d) Voltage drop test (*see* **6.5**);
- e) Insulation resistance test (*see* **6.6**);
- f) Endurance test (*see* **6.7**);
- g) Mechanical strength (**6.8**);
- h) Vibration test (*see* **6.9**);
- j) Dry heat test (*see* **6.10**);
- k) Damp heat cycling test (*see* **6.11**);
- m) Cold test (*see* **6.12**);
- n) Dust test (*see* **6.13**);
- p) Test for weather-proofness (*see* **6.14**);
- q) Corrosion resistance test (*see* **6.15**); and
- r) Drop and topple test (*see* **6.16**).

6.1.1.1 *Criteria for approval* — Ten samples of the same rating shall be submitted for testing along with the relevant data. These shall be tested according to the test schedule given in Appendix A. The testing authority shall issue a type approval certificate if the dip switches are found to comply with the requirements of tests given in **6.1.1**.

6.1.1.2 In case of failure in one or more type test, the testing authority may call for fresh samples not exceeding twice the number of original samples and subject them to test(s) in which failure occurred. If, in repeat test(s) no failure occurs, the test may be considered to have been satisfactory.

6.1.2 Acceptance Tests — The following shall constitute acceptance tests:

- a) Visual examination (*see* **6.2**);
- b) Measurement of dimension (*see* **6.3**);
- c) Performance test (*see* **6.4**); and
- d) Voltage drop test (*see* **6.5**).

6.1.2.1 Sampling plan and criteria for acceptance — A recommended sampling plan and criteria for acceptance of a lot is given in Appendix B.

6.1.3 Routine Tests — The following shall constitute routine tests:

- a) Visual examination (**6.2**), and
- b) Performance test (**6.4**).

6.2 Visual Examination — The switches shall be examined for finish, and assembly and shall be free from injurious flaws or other defects.

6.3 Measurement of Dimensions — The switch shall conform to the dimensions as stated in **4.1**.

6.4 Performance Tests

6.4.1 Mechanical Tests

6.4.1.1 The operation of dip switches shall be smooth yet positive. These shall be so constructed that a partial operation of the switch plunger will not permit an open circuit to be maintained.

6.4.1.2 The force required to operate dip switches shall be between 30 and 70 N.

6.4.1.3 The travel of the plunger to operate the switch should not exceed 15 mm.

6.4.2 Electrical Test — The switch shall be connected in a suitable circuit adjusted to pass rated current through the switch. The switch shall be operated ten times. The circuit operation shall be positive and free from any abnormalities, for example, flicker of lamp load.

6.5 Voltage Drop Test

6.5.1 The switch shall be connected in a suitable resistance circuit adjusted to pass 10 A through each pair of terminals. The voltage drop between the terminals (due to contact resistance) shall be noted. It shall not exceed 80 mV before endurance test and 120 mV after endurance test.

6.6 Insulation Resistance Test — The insulation resistance shall be measured between terminal and metallic body with a voltage of 500 V dc at the prevailing atmospheric temperature and humidity. The insulation resistance shall be not less than 1 Megohm.

6.7 Endurance Test

6.7.1 The switch shall be suitably mounted in a test bench and tested at an ambient temperature of $27 \pm 2^{\circ}\text{C}$. The switch shall be connected to a load of 140 W at a test terminal voltage of 14 V for switches intended for operation at 12 V or at 28 V for switches intended for operation at 24 V. The switch shall be tested at the rate of 25 ± 5 cycle per minute. One cycle shall consist of the following sequence of positions high beam-low beam-high beam. The connected test load shall be in the form of a suitable lamp. The testing shall be so designed as to exert a force as specified in **6.4.1.2** and not to damage the switch. The switch shall be operated for 100 000 cycles. The switch after being subjected to this test shall be allowed to come down to room temperature and tested for insulation resistance, voltage drop and performance tests.

6.7.2 The change in the operating force after this test shall not be more than 3 percent of the initial value.

6.8 Mechanical Strength — The switch shall be mounted on a suitable test bench. An initial force of 50 N shall be applied which shall be increased to 500 N over a period of not more than 5 seconds and maintained for a period of 5 seconds after which the entire force is removed.

At the end of the test, the switch shall meet the requirements of **6.2**, **6.4** and **6.5**.

6.9 Vibration Test — This test shall be conducted in accordance with **4.1** of IS : 10250-1982* under the following conditions:

Frequency range	10-55-10 Hz
Displacement amplitude	1.5 mm
Total duration	3 hours

At the end of the test, the dip switch shall meet the requirements of **6.2**, **6.4** and **6.5**.

6.10 Dry Heat Test — This test shall be conducted in accordance with **4.2** of IS : 10250-1982* under the following conditions:

Temperature	$70 \pm 2^{\circ}\text{C}$
Duration	4 hours

*Specification for severities for environmental tests for automotive electrical equipment.

At the end of test, the dip switch shall meet the requirements of **6.4** and **6.6**. Parts of non-metallic materials shall not show any breakage/deformation.

6.11 Damp Heat (Cycling) Test — This test shall be carried out in accordance with **4.3** of IS : 10250-1982*. The number of conditioning cycles shall be 7.

The switch after the test shall meet the requirements of **6.4**.

6.12 Cold Test — This test shall be carried out in accordance with **4.4** of IS : 10250-1982*.

At the end of the test, the dip switch shall meet the requirements of **6.4** and **6.5**. Parts of non-metallic materials shall not show any breakage/deformation.

6.13 Dust Test — This test shall be carried out in accordance with **4.6** of IS : 10250-1982*.

At the end of the test the dip switch shall meet the requirements of **6.4** and **6.5**.

6.14 Test for Weather Proofness — The test shall be carried out in accordance with **4.13** of IS : 10250-1982*.

At the end of the test, the dip switch shall not show any abnormality in its operation (**6.4**). There shall be no fall in insulation resistance (**6.6**) and no increase in contact voltage drop (**6.5**).

6.15 Corrosion Resistance Test — This test shall be carried out in accordance with **4.8** of IS : 10250-1982*.

After removal from salt spray chamber, the dip switch shall not show any sign of corrosion. At the end of the test the dip switch shall meet the requirements of **6.4**, **6.5** and **6.6**.

6.16 Drop and Topple Test — This test shall be carried out in accordance with **4.10** of IS : 10250-1982*. The drop height shall be 200 mm.

At the end of the test, the dip switch shall pass the test of **6.4**, **6.5** and **6.6**.

*Specification for severities for environmental tests for automotive electrical equipment.

APPENDIX A

(Clause 6.1.1.1)

CLAUSE No.	TEST	SEQUENCE SAMPLE No.									
		1	2	3	4	5	6	7	8	9	10
6.2	Visual examination	×	×	×	×	×	×	×	×	×	×
6.3	Measurement of dimension	×									
6.4	Performance test		×	×	×	×	×	×	×	×	×
6.5	Voltage drop test		×	×	×	×	×	×	×	×	×
6.6	Insulation resistance test		×	×	×	×	×	×	×	×	×
6.7	Endurance test	×									
6.8	Mechanical Strength		×								
6.9	Vibration test			×							
6.10	Dry heat test				×						
6.11	Damp heat (cycling) test					×					
6.12	Cold test						×				
6.13	Dust test							×			
6.14	Test for weather proofness								×		
6.15	Corrosion resistance test									×	
6.16	Drop and topple test										×

APPENDIX B

(Clause 6.1.2.1)

SAMPLING PLAN OF SWITCHES**B-1. SCALE OF SAMPLING**

B-1.1 Lot — In any consignment, all switches of the same rating manufactured from the same raw material under similar conditions of production shall be grouped together to constitute a lot.

B-1.2 The number of switches to be selected from each lot shall depend upon the lot size and shall be in accordance with col 1 and 2 of Table 1.

B-1.2.1 These switches shall be selected from the lot at random. In order to ensure the randomness of selection, procedure given in IS : 4905-1968* may be followed.

*Methods for random sampling.

**TABLE 1 SIZE OF SAMPLE AND PERMISSIBLE NUMBER OF
DEFFECTIVES***(Clauses B-1.2 and B-2.1)*

LOT SIZE	SAMPLE SIZE	PERMISSIBLE NUMBER OF DEFFECTIVES
(1)	(2)	(3)
Up to 100	8	0
101 to 300	13	1
301 to 500	20	1
501 to 1 000	32	2
1 000 and above	50	3

B-2. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-2.1 The switches selected at random according to col 1 and 2 of Table 1 shall be examined for visual requirements and subjected to performance and voltage drop test. The switches failing to satisfy any these requirements shall be considered as defective. The lot shall be considered conforming to the requirements of this specification if the number of defective switches found in the sample is less than or equal to corresponding permissible number given in col 3 of Table 1, otherwise the lot shall be rejected.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	$1 \text{ N} = 1 \text{ kg.m/s}^2$
Energy	joule	J	$1 \text{ J} = 1 \text{ N.m}$
Power	watt	W	$1 \text{ W} = 1 \text{ J/s}$
Flux	weber	Wb	$1 \text{ Wb} = 1 \text{ V.s}$
Flux density	tesla	T	$1 \text{ T} = 1 \text{ Wb/m}^2$
Frequency	hertz	Hz	$1 \text{ Hz} = 1 \text{ c/s (s}^{-1}\text{)}$
Electric conductance	siemens	S	$1 \text{ S} = 1 \text{ A/V}$
Electromotive force	volt	V	$1 \text{ V} = 1 \text{ W/A}$
Pressure, stress	pascal	Pa	$1 \text{ Pa} = 1 \text{ N/m}^2$

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